In the Claims

1. (Previously Presented) A method of multi-slice image acquisition with black blood contrast, the method comprising the steps of:

applying a non-selective inversion pulse in successive R-R intervals;

applying a re-inversion pulse in the successive R-R intervals that is slice-selective over a region encompassing a plurality of slice selections;

timing execution of a series of RF excitation pulses such that signal from blood is near a null point in each R-R interval; and

acquiring data of at least two slices for each application of the re-inversion pulse in the successive R-R intervals.

2. (Previously Presented) The method of claim 1 wherein the plurality of slice selections includes two sets of slice selections and further comprising the step of acquiring data for a first set of slice selections in a first R-R interval and acquiring data for a second set of slice selections in a next R-R interval.

3. (Original) The method of claim 2 wherein each set includes two slice selections using a fast spin echo readout.

4. (Original) The method of claim 2 further comprising the step of alternating data acquisition of the two sets of slice selections until k-space is filled.

5. (Original) The method of claim 1 further comprising the step of acquiring more than one slice of MR data per patient breath-hold.

6. (Original) The method of claim 5 further comprising the step of acquiring four slices of MR data per patient breath-hold.

7. (Previously Presented) A computer readable storage medium having a computer program stored thereon, the computer program representing a set of instructions that when executed by a computer causes the computer to:

generate and cause application of a non-selective inversion pulse applicable to a slab of slices, the non-selective inversion pulse to be applied in each R-R interval;

generate and cause application of a slice-selective re-inversion pulse applicable to the slab of slices applied after each non-selective inversion pulse; and

generate and cause application of a series of spin echo readout excitation pulses applicable to the slab of slices such that MR data with black blood contrast is acquired of a first set of at least two slices of the slab during a first R-R interval after application of a respective single slice-selective re-inversion pulse and of a second set of at least two slices of the slab during a next R-R interval after application of a respective single slice-selective re-inversion pulse.

8. (Previously Presented) The computer readable storage medium of claim 7 wherein the set of instructions further cause the computer to delay for a TI period between generation and application of the re-inversion pulse and the series of excitation pulses in each R-R interval sufficient in length to allow magnetization of blood in the slab to substantially reach a null point before data acquisition.

9-10. (Canceled)

11. (Currently Amended) The computer readable storage medium of claim ~~10~~ 7 wherein the at least two slices of the first set are different from the at least two slices of the second set.

12. (Previously Presented) The computer readable storage medium of claim 7 wherein the set of instructions further cause the computer to acquire data for more than one slice during a single patient breath-hold.

13. (Previously Presented) An MRI apparatus comprising:

a magnetic resonance imaging (MRI) system having a plurality of gradient coils positioned about a bore of a magnet to impress a polarizing magnetic field and an RF transceiver system and an RF switch controlled by a pulse module to transmit RF signals to an RF coil assembly to acquire MR images; and

a computer programmed to apply a pulse sequence having a first and a second inversion pulse during each heartbeat of a successive train of heartbeats and a series of readout excitation pulses during each heartbeat of the successive train of heartbeats such that at least two slices of data with black blood contrast are acquired for each application of one of the first and the second inversion pulses during each heartbeat of the successive train of heartbeats.

14. (Original) The MR apparatus of claim 13 wherein the first inversion pulse is a non-selective 180 degree pulse and the second inversion pulse is a selective 180 degree pulse designed to re-invert magnetization in a slab containing a plurality of slices.

15. (Original) The MR apparatus of claim 14 wherein the pulse sequence is further configured to acquire MR data for multiple slices in each heartbeat of the train of heartbeats.

16. (Original) The MR apparatus of claim 15 wherein the slices in a first heartbeat are different from that of a next heartbeat.

17. (Original) The MR apparatus of claim 13 wherein the computer is further programmed to apply the pulse sequence such that a plurality of slices of MR data is acquired in a single patient breath-hold.

18. (Original) The MR apparatus of claim 13 wherein the pulse sequence further includes a TI period between the re-inversion pulse and the series of excitation pulses in each R-R interval sufficient in length to allow magnetization of blood in the slab to substantially reach a null point before data acquisition.

19. (Previously Presented) A computer readable storage medium having a computer program stored thereon, the computer program representing a set of instructions that when executed by a computer causes the computer to:

generate and cause application of a non-selective inversion RF pulse to a slab of slices during successive R-R intervals;

generate and cause application of a slice-selective re-inversion RF pulse to the slab of slices during successive R-R intervals;

delay data acquisition in each R-R interval by an inversion time sufficient to allow magnetization of blood within the slab to substantially reach a null point;

apply a series of RF excitation pulses in each R-R interval; and

acquire MR data for at least two slices in the slab for each slice-selective re-inversion RF pulse in each R-R interval.

20. (Original) The computer readable storage medium of claim 19 wherein the set of instructions further causes the computer to acquire data for two slices in the slab in each R-R interval.

21. (Original) The computer readable storage medium of claim 20 wherein the two slices of a first R-R interval is different from the two slices of a next R-R interval.

22. (Original) The computer readable storage medium of claim 21 wherein tissue for each slice in the slab is excited during every other R-R interval.

23. (Original) The computer readable storage medium of claim 19 wherein the set of instructions further causes the computer to acquire more than one slice of MR data in a single patient breath-hold.

24. (Original) The computer readable storage medium of claim 23 wherein the more than one includes four slices of data in a single patient breath-hold.

25. (Previously Presented) A computer readable storage medium having a computer program stored thereon, the computer program representing a set of instructions that when executed by a computer causes the computer to:

generate and cause application of a non-selective inversion pulse to be carried out in each R-R interval of a train of R-R intervals;

generate and cause application of a slice-selective re-inversion pulse to be carried out after the non-selective inversion pulse in each R-R interval; and

generate and cause application of a set of excitation pulses to be applied in each R-R interval such that MR data may be acquired for at least two slices in a slab during each R-R interval and for each slice-selective re-inversion pulse.

26. (Previously Presented) The computer readable storage medium of claim 25 wherein the wherein the set of instructions further cause the computer to incorporate an inversion recovery time in each R-R interval sufficient to allow magnetization of blood within the slab to substantially reach a null point.